

## Section Life Cycle Management

## Data Collection Format

## Data Collection Format for Life Cycle Assessment of the German Association of the Automotive Industry (VDA)

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**Abstract.** The subcommittee for Life Cycle Assessment of the German Association of the Automotive Industry (Verband der Automobilindustrie – VDA) developed a Data Collection Format for Life Cycle Assessment which has been adopted by the VDA Environmental Management Committee, representing not only the German automobile manufacturers, but also their development partners, the suppliers, and manufacturers of trailers, body superstructures and containers.

This paper introduces the background and some main aspects of the VDA LCA data collection format. All documents including a manual, a checklist and the data collection format as such can be downloaded from the VDA website ([http://www.vda.de/en/vda/intern/organisation/abteilungen/umwelt\\_04.html](http://www.vda.de/en/vda/intern/organisation/abteilungen/umwelt_04.html)).

**Keywords:** Automotive industry; data; data collection; data format; life cycle assessment (LCA); life cycle inventory analysis (LCI); Verband der Automobilindustrie – VDA (German Association of the Automotive Industry)

## Introduction

The German Association of the Automotive Industry (VDA) consists of automobile manufacturers and their development partners, the suppliers, and of the manufacturers of trailers, body superstructures and containers. The fact that automobile manufacturers and suppliers are members of a joint association is by no means common at the international level: in many other countries, the different companies belong to separate associations. The members of the association are companies that operate a plant in the Federal Republic of Germany for the industrial production of motor vehicles and their engines, trailers, special bodies and containers and vehicle parts and accessories. From these manufacturing sectors, about 510 companies with a total of 710,000 employees are members of the association.

The VDA nationally and internationally promotes the interests of the entire German automotive industry in all fields of the motor transport sector, for example in economic, trans-

port and environmental policy, technical legislation, standardisation and quality assurance.

The VDA subcommittee for Life Cycle Assessment has been constituted in 1999 and reports to the Environmental Management Committee. One of the recent projects of the subcommittee was the development of a common VDA LCA Data Collection Format. This project was motivated by both data suppliers and data users. Data suppliers (e.g. part suppliers) suffered from the situation, that different data users asked for LCA data in different formats, in cases even for the same part. The data users had to introduce their company specific data formats to all their data suppliers. Therefore, it appeared that a common data collection format would benefit both data suppliers and data users by increasing efficiency and a more consistent data quality.

## 1 Goals of the VDA LCA Data Collection Format

The VDA LCA Data Collection Format serves as a means for collection, processing and documentation of environmentally relevant process data along the life cycle of a product, specifically for the LCA-component 'Life Cycle Inventory Analysis (LCI)' in accordance with the ISO 14040 series [1].

There is fairly large experience of LCA data collection in the German automotive industry. Based on this real life experience, the approach chosen reflects the insight, that a data collection format that is intended to be used has to be as lean as possible and as big as necessary with a clear focus on 'need to have' rather than 'nice to have'. Practically speaking, the minimum target is to get above 80% of the necessary data in more than 80% of the data requests in a time frame of days or weeks, rather than 100% of the academically desired data in less than 5% of the requests in a time frame of months.

In order to supply a data collection format that is acceptable for all parts of the automotive industry, the VDA sub-

committee Life Cycle Assessment has taken into consideration the following basic principles in working out this format or has adjusted them to the specific conditions:

- It is intended that filling in the VDA LCA Data Collection Format requires no expert knowledge of the environmental management tool LCA.
- All regulations, guidelines and agreements (i.e. ISO 14040ff, BDI Guidance for Handling) are taken into account.
- In general, data necessary for filling in the VDA LCA Data Collection Format could be taken from operational information and documentary systems (like e.g. Process control systems, ERP-Systems, VDA-'initial sample test reports', IMDS, Licenses, Emissions statements and surveillance of emissions for plants requiring official approval, Waste balances and proof of disposal, Information given to fulfil the laws and/or regulations on environmental statistics, Classification of materials and preparations according to the Hazardous Material Ordinance, Internal quality and environmental management systems, Environmental reports and statements, Maintenance of occupational safety and health standards).
- Simplifying the procedure of collection, processing and documentation of data for the Life Cycle Inventory Analysis, both for data suppliers as well as users, is of utmost priority.
- By standardisation of the data collection procedures, definitions and the minimum requirements, additional efforts for data suppliers as well as users can be avoided and at the same time a high degree of transparency is guaranteed.
- With regard to the trade-off between completeness and practicability, the data collection format should reflect the present state of the art of LCA in the automotive industry.
- At the same time reducing the processing times for LCA requests of various member companies will occur.

It is definitely not the goal of the VDA LCA Data Collection Format to exceed the present state of standardised collection of life cycle inventory data by member companies or among the member companies. The respective company-specific requirements and agreements remain valid.

It is the LCA subcommittee's common position that the present VDA LCA Data Collection Format shall be applied to all external projects in which individual or all VDA member companies participate.

## 2 Applications and System Boundaries

The VDA LCA Data Collection Format can generally be applied to the following cases:

- production of automotive components and sub-systems (e.g. bumper, intake manifold,...),
- production of operating materials for automobiles (e.g. transmission oil, air condition fluid,...),
- production processes,
- recovery and disposal processes.

Additionally, for further processing the information in the life cycle inventory analysis existing data sets (e.g. for energy supply, production of basic materials and disposal processes) are taken into consideration by the data user.

These data sets as well as the agreements on the use phase are vehicle-specific and producer-specific and for this reason highly variable and complex. Therefore it is not possible to compare the results of the LCA / LCI for similar components of different producers, even if they are based on the same information taken from the VDA LCA Data Collection Format.

Another important aspect for the application are the system boundaries. System boundaries in the field of LCA can be subdivided into three general categories: the complete life cycle ('cradle-to-grave'), the part of the life cycle from raw material extraction to the final product ('cradle-to-gate') as well as this part of the life cycle that refers to processes between factory gates which is sometimes called corporate ecobalance ('gate-to-gate'). These types of system boundaries are schematically shown in Fig. 1.

For the VDA LCA Data Collection Format the system boundary is defined as the producer's factory gates ('gate to gate'), i.e. all processes that are being conducted by the process owner are part of the system. External processes that are carried out by others for the production of purchased materials, components and energy as well as for further processing and/or recovery of products and waste, are outside the

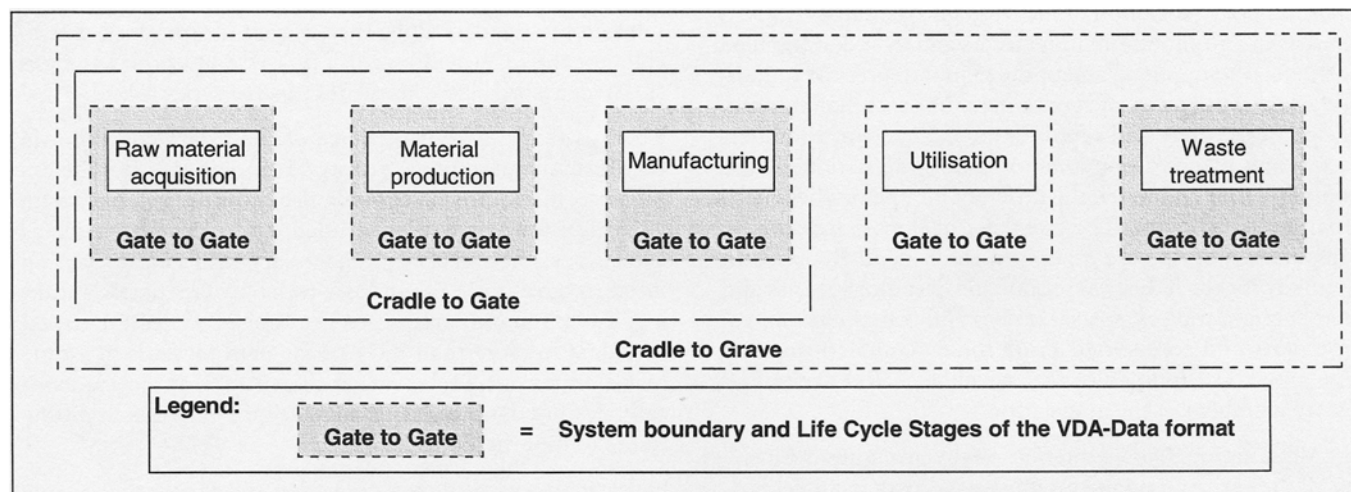


Fig. 1: Schematic representation of the system boundaries and the life cycle stages of the VDA LCA Data Collection Format

system boundaries. For these cases only the suppliers and suitable contacts have to be listed.

This system boundary has been chosen for several reasons:

- it allows the data user to connect the process data with background data in a consistent way,
- it does not force the data suppliers to have lca knowledge, to compile a lci, to purchase and use a (specific) lca software,
- it supports transparency and provides the opportunity to make data quality checks based on technical knowledge of the processes.

### 3 Document Structure and Access

All documents including a manual, a checklist and the data collection format as such can be downloaded from the VDA website [2]. The most comprehensive document is the manual for the VDA LCA Data Collection Format for Life Cycle Assessment (LCA). It mainly addresses a target audience with limited experience in the field of LCA or those users of the VDA LCA Data Collection Format that are interested in further background information or general methodological aspects. This manual is divided up into five sections:

Chapter 1: Background and Goals of the VDA LCA Data Collection Format

Chapter 2: VDA LCA Data Collection Format Spreadsheet

Chapter 3: VDA LCA Data Collection Format Manual

Chapter 4: Checklist for Filling in the VDA LCA Data Collection Format

Chapter 5: Example of Use

Chapter 1 (Background and Goals of the VDA LCA Data Collection Format) describes the motivation for a standardised VDA LCA Data Collection Format and its purpose. In chapter 2 (VDA LCA Data Collection Format Spreadsheet)

the contents and the form of the format are given. Chapter 3 (VDA LCA Data Collection Format Manual) offers general notes and assistance for handling the data collection format, whereas in chapter 4 the checklist for the VDA LCA Data Collection Format offers practical support for the user by leading him step by step through the format.

The example of use (chapter 5) illustrates how to fill in the format using the production of a front fender (side panel) without primer as exemplary case.

There are two further documents available for direct use of experienced practitioners. They are basically the 'Checklist' and 'VDA Data Collection Format Spreadsheet' chapters of the manual. As these two parts are actually used for the data collection, they can be downloaded as separate files for convenience reasons.

### References

- [1] ISO 14040:1997 – Environmental Management – Life Cycle Assessment – Principles and Framework; ISO 14041:1998 – Environmental Management – Life Cycle Assessment – Goal and Scope Definition and Inventory Analysis; ISO 14042:2000 – Environmental Management – Life Cycle Assessment – Life Cycle Impact Assessment; ISO 14043:2000 – Environmental Management – Life Cycle Assessment – Life Cycle Interpretation
- [2] VDA Subcommittee Life Cycle Assessment (2003): German Association of the Automotive Industry (Verband der Automobilindustrie – VDA) – Data Collection Format for Life Cycle Assessment, Adopted Document from 07.08.2003 – Version 1.1, Current versions of the documents are available as download from the VDA homepage at: [http://www.vda.de/en/vda/intern/organisation/abteilungen/umwelt\\_04.html](http://www.vda.de/en/vda/intern/organisation/abteilungen/umwelt_04.html)

## Book Presentations

### A Theory of the Environment and Economic Systems

#### A Unified Framework for Ecological Economic Analysis and Decision Support\*

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Edward Elgar Publishing, Cheltenham, 2001 (<http://www.e-elgar.co.uk>), Harbound, 352 pp., 64.95 GBP / 100.00 USD; ISBN 352-1-84064-643-8

**Contents:** Preface Part I: Introduction 1. The Questions 2. The Scientific Context 3. Outlook Part II: Economic Systems 4. Introduction to Part Two 5. Economic Processes 6. On Solving the First Fundamental Equation 7. Towards Concrete Tools for Environmental Analysis and Decision-Support: Inventory Analysis Part III: The Environment 8. Introduction to Part Three 9. Environmental Processes 10. Environmental Impacts 11. The Environmental Problem 12. Towards Concrete Tools for Environmental Analysis and Decision-Support: Impact Analysis Part IV: Conclusion 13. The Answers 14. Further Reflections 15. Summary of Findings References Index

A number of tools for environmental analysis and decision support have been developed over time, including life-cycle assessment, substance-flow analysis, environmental impact and risk assessment. Many of these tools have different economic systems – a product, a regional

substance-flow, a factory or emission pattern, etc. – as their object. This book aims to reconcile and unify the many different tools for environmental analysis and decision-support into one meta-tool.

The subject of this study revolves around two problems: the attribution problem – which environmental problems are to be attributed to which economic activities; and the position problem – what is the relative position of a number of the various tools for environmental decision-support? Both these problems can be resolved by the construction of a general framework and specific methodological steps within the framework. The main focus of this study is on the methodology.

By providing a common framework for topics often treated in isolation this book enables experts from many fields, including scholars of environmental, resource and ecological economics, environmental science as well as researchers and professionals within industrial ecology, to understand the full depth and range of the material.

\* Heijungs, R.: Economic Drama and the Environmental Stage. Formal derivation of algorithmic tools for environmental analysis and decision-support from a unified epistemological principle. Proefschrift. Leiden 1997 [see also Int J LCA 2 (4) 195–196 (1997)]